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(54) Title: GALACTURONOSYL TRANSFERASES, NUCLEIC ACIDS ENCODING SAME AND USES THEREFOR

(57) Abstract: The invention provides an isolated nucleic acid molecule encoding the polypeptide having galacturonosyltransferase (GalAT) activity. The *GALA T 1* disclosed represents the first pectin biosynthetic glycosyltransferase gene isolated from plants. The invention further provides 14 *GALAT* and 10 *GALAT*-like gene superfamily members. The identification of the *GALAT* gene superfamily offers new opportunities to modulate pectin synthesis *in vivo* and *in vitro* by modulating the *GALAT* gene, for example, transgenic plants that produce modified pectins can be generated by altering the *GALAT* gene. Since modified pectins are predicted to affect plant growth, development, and plant defense responses, the transgenic plants are expected to have improved agricultural value. The modified pectins isolated from such transgenic plants are useful as gelling and stabilizing agents in the food, nutraceutical, and pharmaceutical industries. The expressed proteins, and variants thereof, of the *GALAT* superfamily are useful to produce *in vitro* modified pectins of commercial value.

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